

REMARKS

By this Amendment, claims 1-24 are currently pending in this application.

Claims 1-10, 14, 17 and 22 have been amended. New claim 24 has been added and no claims have been canceled. Reconsideration based upon the above amendments and following remarks is respectfully requested.

I. Claim Objections Under 37 C.F.R. § 1.75(c)

The Examiner has objected to claims 17-19 under 37 C.F.R. § 1.75(c) as being of improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. Applicants have amended claims 14 and 17 to specifically address the improper form of the dependent claims 17-19. Accordingly, the amendment to claim 14 obviates the objection to claim 17, and with the claim amendments made to claim 17, also obviate the objection to claims 18 and 19 which depend there from claim 17. Accordingly, Applicants respectfully request the withdrawal of the objection to claims 17-19 based on being in improper form.

II. Claim Rejections Under 35 U.S.C. § 112

The Examiner rejects claims 1-23 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Pursuant to the above amendments, Applicants have amended claims 1-10, and specifically independent claim 1 to more clearly claim Applicants' invention. Furthermore, Applicants believe that these amendments, more clearly set forth the recited elements and relationships of Applicants' claimed invention. With regards to claims 2-23 that all depend from independent claim 1, and for at least the same basis that the amendment to claim 1 more clearly claim Applicants' invention, claims 2-23 also more clearly claim Applicants' invention. Therefore, the amendments made to at least claims 1-10, obviate the rejections under 35 U.S.C. § 112, second paragraph. The Applicants therefore respectfully request the withdrawal of the rejection of claims 1-23 under section 112, second paragraph.

III. Claim Rejections Under 35 U.S.C. § 101

The Examiner rejects claim 22 under 35 U.S.C. § 101 because claim 22 defines a computer program embodying functional descriptive material. However, the Examiner alleges that the claim does not define a computer-readable medium or memory and is thus non-statutory.

While not conceding that the original claim is in fact non-statutory, in a spirit of compact prosecution, Applicants have amended claim 22 to recite a computer program embodied on a computer-readable medium as suggested by the Examiner. Accordingly, Applicants respectfully request the withdrawal of the rejection of claim 22 under section 101.

IV. Claim Rejections Under 35 U.S.C. § 102 and § 103

The Examiner rejects claims 1-7, 11, 15, 16 and 20-23 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,661,908 to Suchard et al. (hereinafter "Suchard"); and rejects 8-10, and 12-14 under 35 U.S.C. § 103(a) as being unpatentable over Suchard in view of U.S. Patent No. 6,563,952 to Srivastava et al. (hereinafter "Srivastava"). These rejections are respectfully traversed.

The present invention provides a hierarchical tree structure of a data representation of object/image data, as illustrated in Figures 4 and 5 of the application. As can be seen in these drawings, the hierarchical structure includes a root node (N_0), which is the most approximate representation of the image, and child nodes of successively better approximation of the image, and including terminal leaf nodes.

This hierarchical data model of input data is derived in accordance with the method of amended claim 1, and one embodiment is described in the present application from page 7, line 28 to page 9, line 12.

In particular, starting with input, image data comprising a data distribution having a plurality of data elements in a multidimensional data space, an approximate representation of the data distribution is derived (step (a)) using, for example, principal component analysis (PCA), and forms a node in the hierarchical representation. From the approximate representation, error

data comprising errors of the data elements of the approximate representation is derived (step (b)). The error data is then analyzed to determine if the errors of the data elements meet predetermined criteria step (c)). If the predetermined criteria are met, the node forms a leaf node (step (d)). Otherwise, the method is repeated recursively (step (e)), by using the error data as a next data distribution (and forming a chilled node), each repetition creating one or more child nodes in the hierarchical structure.

Applicants submit that, in dramatic contrast to claimed invention, none of the asserted references, whether taken alone or in combination at least teach or suggest each and every element of claim 1, including the features identified above. That is, as best understood, there is simply nothing in Suchard or Srivastava that remotely suggests a method of providing a representation of data distribution of data elements in a multi-dimensional data space derived from at least one object or image by processing signals corresponding to the object or image, the representation having a hierarchical structure, the method comprising the five steps set forth in steps (a)-(e), in for example, claim 1 above.

For example, and in regards to Suchard, the Examiner has attempted to apply a process of authenticating the signature authentication/verification system as described at column 7, lines 5-28 of Suchard for example, to translate raw data into high dimensional vectors. More specifically, the predefined process in Suchard represent the high dimensional input data to the process, and step 200 is the technique for acquiring that data from a given device data. Thus, step 200 of Suchard does not constitute a method of “representing” the signature data.

In contrast, the present invention is the hierarchical process (obtained by recursion) of representing *high-dimensional* (input) data, i.e., it is assumed that high-dimensional data, such as that acquired in step 200 of Fig. 1 of Suchard, are already in place at the outset of the method of the instant invention. Moreover, when it comes to the actual data representation, as described at column 7, line 57 to column 8, line 6 (step 300) of Figure 1 of Suchard, the method uses a technique equivalent to local principle component analysis (LPCA) as described in the present application. However, Suchard specifically identifies data clusters and computes a linear subspace for each cluster. There is no disclosure of any *hierarchical data* analysis based on data

representation errors. Instead, the method of Suchard deals only with the data itself and not with the data representation errors.

Still further, the passage at column 9, lines 40-65, and referred to by the Examiner is concerned with step 500 of Figure 1 of Suchard, in which the process compares a sampled signature with a learnt original signature for the purposes of authentication. This step is clearly not part of the process of representing the sampled signature data, and, the comparison of the data for two different images (the original signature and the sample signature) and cannot be considered as an equivalent to the deriving error data from an approximate representation of data of a single image, as in the method of the present invention.

For at least these reasons, it is submitted that at least the method recited in claim 1 is not anticipated by the disclosure of Suchard, which fails to disclose any of the five steps in a technique for representing its image data. As such, claim 1 is clearly patentable. Because claims 2-23 from depend from independent claim 1, claims 2-23 are at least patentable by virtue of dependency as well as for their additional recitations. According, the immediate withdrawal of the prior art rejections of claims 1-23 is respectfully requested with regards to Suchard.

With regards to claims 8-10 and 12-14 rejected under section 103 over Suchard in view of Srivastava, it is respectfully requested that the Examiner consider that Srivastava fails to provide what is lacking with regards to Suchard as applied at least independent claim 1, and for at least the same reasons discussed above.

In addition, Srivastava deals exclusively with a classification of high-dimensional input data. Its crucial step is flattening the input data into binary (Boolean) form, which, as acknowledged therein, is an approach suitable for data that can be described by categorical attributes (features). In the case of continuous attributes the flattening step is equivalent to each feature binarization which usually causes a loss of a great deal of the original information. *Therefore this method is unsuitable for high-dimensional continuous data (images) representation.*

As such, Applicants respectfully assert that the Examiner has failed to meet his burden under a prima facie case of obviousness under section 103. Further Applicants respectfully assert that the combination of Suchard with Srivastava fails to render obvious any of the claims

of Applicants' invention. Accordingly, for at least the reasons discussed above, claims 8-10 and 12-14 are not rendered obvious in view of the combination of Suchard in view of Srivastava under section 103. Therefore, the Applicants respectfully request the immediate withdrawal of the prior art rejections of claims 8-10 and 12-14 under section 103 in view of Suchard with Srivastava.

IV. Conclusion

All matters having been addressed in view of the foregoing, Applicants respectfully request the entry of this Amendment, the Examiner's reconsideration of this application, and the immediate allowance of all pending claims.

Applicants' undersigned representative remains ready to assist the Examiner in any way to facilitate and expedite the prosecution of this matter. If any point remains an issue in which the Examiner feels would be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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